

HYDROLOGIC AND HYDRAULIC ANALYSIS REPORT

LOCATION

Project : 0609-057-140, B-601
Route : 609
County/City : Mathews County, Virginia
Waterway : Winter Harbor Canal

PREPARED BY

Name : JRS
Organization : VDOT
Date : November 2005

STRUCTURE DESCRIPTION

Abutment A Station: 105+68.86 Finished Grade Elevation 6.59 ft.

Abutment B Station: 106+71.25 Finished Grade Elevation 6.59 ft.

Minimum Low Chord Elevation 4.8 ft.

Skew 10° to centerline 0° to flood flow

102.4' Span Length

Spill through Abutment Type

No Piers

HYDROLOGIC/HYDRAULIC DATA

This crossing is in a costal area influenced by storm surges.

Drainage Area 7.5 Sq. Mi.

HISTORICAL DATA

High Water Elevation 4.7 ft. Date of Occurrence not reported.

Estimated Exceedence Probability <10 %

HYDRAULIC PERFORMANCE

The data presented herein is the result of statistical analysis and indicates an approximate estimate of the performance of this facility.

Estimated Exceedence Probability (%)	Change in existing tidal levels (ft.)	Tidal stage upstream of bridge (ft.)	Velocity thru Bridge Structure (ft/s)
10%	0	4.2	8.0
2%	0	5.7	9.4
1%	0	6.5	9.44
0.2%	0	8.5	9.2

DESIGN SUMMARY

	Exceedence Probability (%)	Stage Elevation (ft.)	
Design Flood	>10	3.8	
*Overtopping Flood	>10	3.3	
Base Flood	1	6.5	
MHW/MLW	0.9	-1.48	

*Roadway overtops before bridge.

DEBRIS POTENTIAL

Debris could be moderate during hurricanes.

ABUTMENT SLOPE PROTECTION RECOMMENDATIONS

38" Class II Dry Riprap over 6" no. 25 or 26 aggregate over filter cloth will be hydraulically satisfactory.

SCOUR PLOTS

A sketch of the final scoured bed profile and the check scoured bed profile is attached

CAUSEWAYS

The use of causeways for temporary construction access was not considered in this analysis. If it is subsequently found necessary to use causeways, they must be submitted to the Hydraulics Unit for analysis and documentation.

STREAM BANK STABILIZATION

The banks should reestablish themselves to the natural conditions.

The Riprap should be placed on all areas that will not support vegetation.

Disturbed areas outside the bridge should be seeded.

COMMENTS

This analysis is only applicable to the structures and approaches described. Any changes in these conditions may invalidate this analysis and should be reviewed by this office.

If this project is an interstate or other **NHS** project and is expected to be in excess of \$1,000,000.00, please notify the **FHWA** that no hydraulic impacts are anticipated.

If you have any questions or need additional information, please contact John Shockey at 540-372-3591 or via electronic mail at John.Shockey@VirginiaDOT.gov. The completed

"**CONFIRMATION OF DESIGN**" should also be sent to SAME.

HYDROLOGIC DATA SHEET

The information presented hereon is to be transcribed to the Hydrologic Data sheet contained in the plan assembly.

LOCATION

Project : 0609-057-140, B-601
Route : 609
County/City : Mathews County, Virginia
Waterway : Winter Harbor Canal

DESCRIPTION

Sheet No. 1 Station: 106+00

Drainage Area 7.5 sq. mi

100' span steel truss

BASE FLOOD

Stage Elevation 6.5 ft.

DESIGN FLOOD

Estimated Exceedence Probability >10 %

Stage Elevation 3.8 ft.

OVERTOPPING FLOOD – Roadway overtops before bridge.

Stage Elevation 3.3 ft.

Estimated Exceedence Probability >10 %

HISTORICAL DATA

Stage Elevation 4.7 ft.

Estimated Exceedence Probability <10 %

REMARKS

CONFIRMATION OF DESIGN

The bridge designer will complete this form and forward it to the Hydraulics Unit confirming that the design that was analyzed is being used.

LOCATION

Project :
Route :
County/City :
Waterway :

STRUCTURE DESCRIPTION

Abutment A Station: _____ Finished Grade Elevation _____ ft. (m)

Abutment B Station: _____ Finished Grade Elevation _____ ft. (m)

Minimum Low Chord Elevation _____ ft. (m)

Skew _____ to centerline _____ to flood flow

Span Length

Abutment Type

Number/Type Piers

ROAD DESIGN NOTIFICATION OF HYDRAULIC ANALYSIS

LOCATION

Route : 609
Project : 0609-057-140, B-601
County/City : Mathews County, Virginia
Waterway Name : Winter Haven Canal

PREPARED BY

Name : JRS
Organization : VDOT
Date : November 2005

HYDRAULIC DATA

The Hydrologic and Hydraulic Analysis has been completed for this site and the report has been furnished to the Bridge Designer. No recommendations were made that would affect the road plans.

The estimated Mean High Tide and Mean Low tide elevations are: 0.9 & -1.48 ft.

REMARKS

This project will not exert a significant flood plain impact.

LOCATION

Project : 0609-057-140, B-601
Route : 609
County/City : Mathews County, Virginia
Waterway : Winter Haven Canal

PREPARED BY

Name : JRS
Organization : VDOT
Date : November 2005

ENVIRONMENTAL DATA

1. Identify involvement within the base flood plain:

This is a skewed crossing of Winter Haven Canal.
The existing bridge will be removed.

2. Traffic service: ADT

Detours available no Length Miles. (km)
Frequency of overtopping Flood > 10% (Roadway overtops before bridge)
Potential damage to the highway facility - moderate

3. Applicable flood plain management criteria:

FEMA regulates flood level, flood velocity, and flow distribution and this project is within FEMA community panel number: 510096 and Zone VE. This project complies with FEMA requirements because there will be no increase in flood levels, velocities or flow distribution.

4. Note social, economic, ecological and human use of the flood plain: Floodplain is most low lying costal marshland with some woods, residential houses and open fields.

5. Drainage area 7.5 sq. mi.

6. Overtopping flood

Exceedence Probability >10 %
Stage 3.3 ft. Roadway overtops before bridge.

7. Compare the hydraulic performance of the proposed action to the hydraulic performance of the existing conditions in terms of:

The flood flow characteristics will not change.
This proposed bridge will replace an existing bridge.
There will be no increase in the level of the 1% flood.

8. Riprap abutment protection:

The following riprap protection is being employed:
38" Class II Dry Riprap over 6" no. 25 or 26 aggregate over filter cloth will be hydraulically satisfactory.
The indicated riprap protection was sized in accordance with the FHWA's BRIDGE SCOUR AND STREAM INSTABILITY COUNTERMEASURES (HEC-23) publication or other nationally accepted or recognized procedure.

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HYDRAULIC COMMENTARY FOR PERMIT

HYDROLOGY

The hydrologic analysis for this project was predicated on Flood Insurance Data for Mathews County, Virginia.

Design Elevation 3.3' 1% Elevation 6.7'

HISTORICAL DATA

Highwater Elevation 4.7 ft (m) Date Not Reported

HYDRAULIC

The hydraulic analysis was performed using accepted principals and techniques of river mechanics applicable to this site.

The proposed facility will not increase the 1% Flood Stage.

Design Flood Stage Elevation 3.3 ft.

1% Flood Stage Elevation 6.7 ft.

CAUSEWAYS

The use of causeways for temporary construction access was not considered in this analysis. If it is subsequently found necessary to use causeways, they must be submitted to the Hydraulics Unit for analysis and documentation.

EROSION AND SEDIMENT CONTROL

An erosion and sediment control plan will be prepared and implemented in compliance with the Erosion and Sediment Control Law, the Erosion and sediment control Regulations, and the annual erosion and sediment control Standards and Specifications approved by the Department of Conservation and Recreation.

STORMWATER MANAGEMENT

Design of this project will be in compliance with the Stormwater Management Act, the Stormwater Management Regulations, and the annual stormwater management Standards and Specifications approved by the Department of Conservation and Recreation.